

SWANTECH Data Summary
NPPD – Ainsworth, Nebraska
Turbines T21 – T24



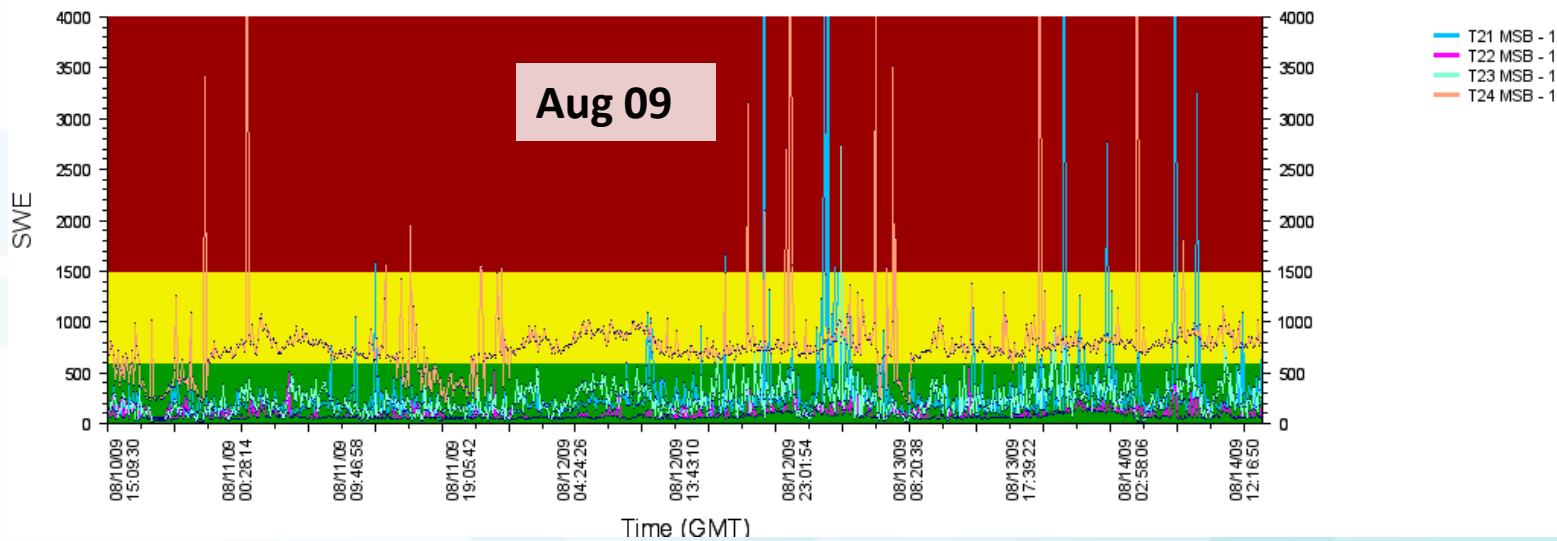
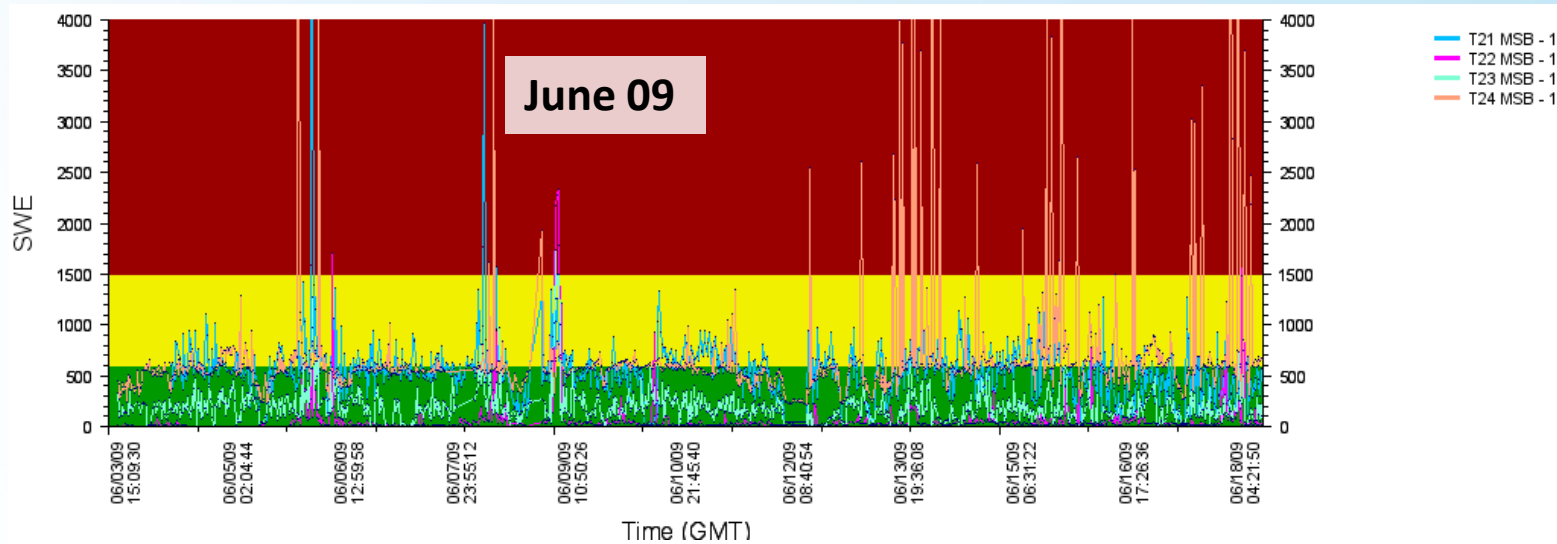
Overview:

- Data comparisons are between the time period before the Vindicator installation on T22 (June 09) to after installation (August 09).
- The SWE historical data is comparing two weeks in June to one week in August.
- Condition Index data is comparing the month of June to one week in August.
- The digital record data is a comparison of a digital record taken in June to one taken in August.

Conclusions:

- SWE plots of T22 main shaft bearing indicate a significant reduction in SWE level and spikes from before to after Vindication installation.
- Condition Index data indicates a statistically significant reduction in SPI and RFI values from before to after Vindication installation on T22.
- SWE and CI data on the other monitored machines in T22 (gearbox and generator) do not indicate a reduction in stress from before to after Vindication installation.
- Digital record plots of time domain, histogram and FFT indicate a reduction in random and periodic friction on T22 main bearing from before to after Vindication installation .

Main Bearing – SWE History Data



Condition Indices Comparison: T21 – T24



	SPI		RFI		PFI	
Main Bearing	June 09	08/10 -14	June 09	08/10 -14	June 09	08/10 -14
T21	464	326	18.9	13.6	6.73	2.40
T22	387	158	54.0	9.0	9.75	2.77
T23	242	262	15.8	15.3	2.35	2.47
T24	694	746	29.8	23.1	1.24	1.30

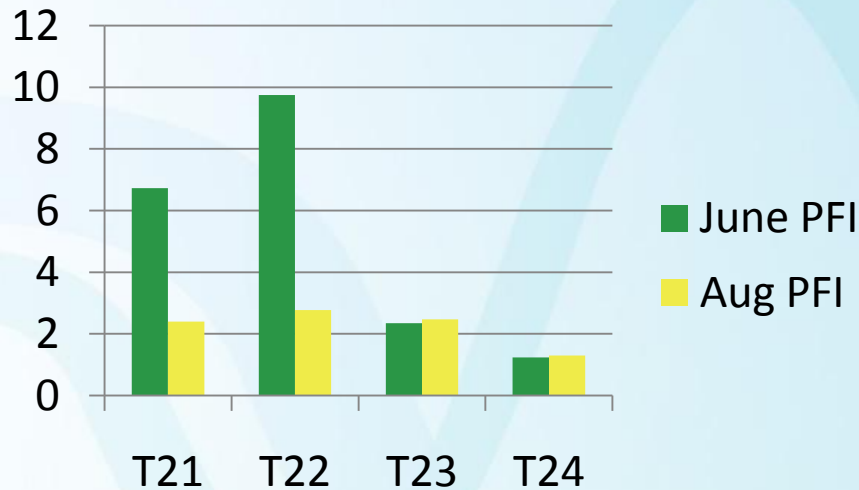
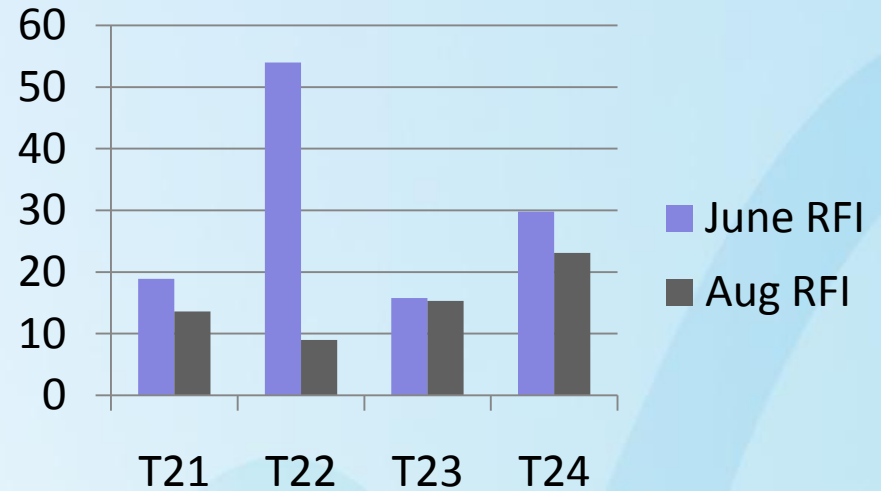
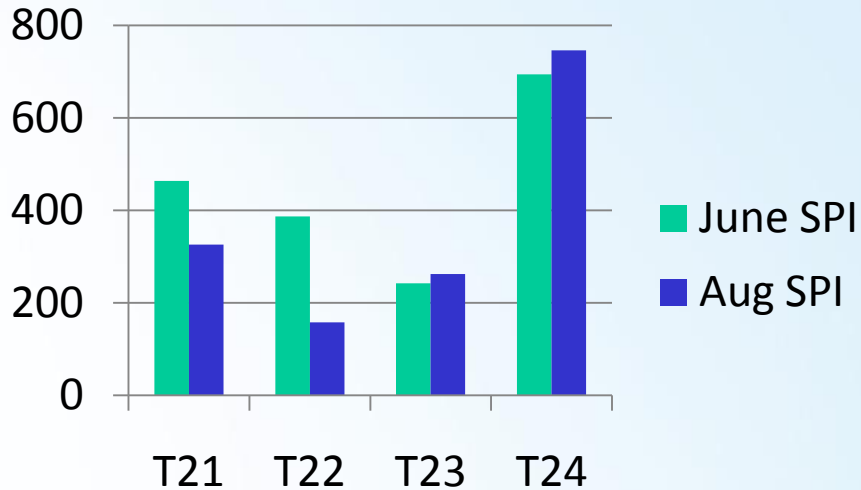
Note:

- CI data compares the month of June with a time period in August (the 10th to the 14th) considered significant by CTW.

Condition Index Definitions:

- **SPI:** SWE Performance Index – an aggregation of SWE data over time
- **RFI:** Random Friction Index – an aggregation of histogram statistical data over time
- **PFI:** Periodic Friction Index – an aggregation of spectral data from FFT plots over time

Condition Indices Comparison: T21 – T24



T22

Digital Record

Data Comparison:

Before vs. After Vindication Installation

Time Domain Data Comparison

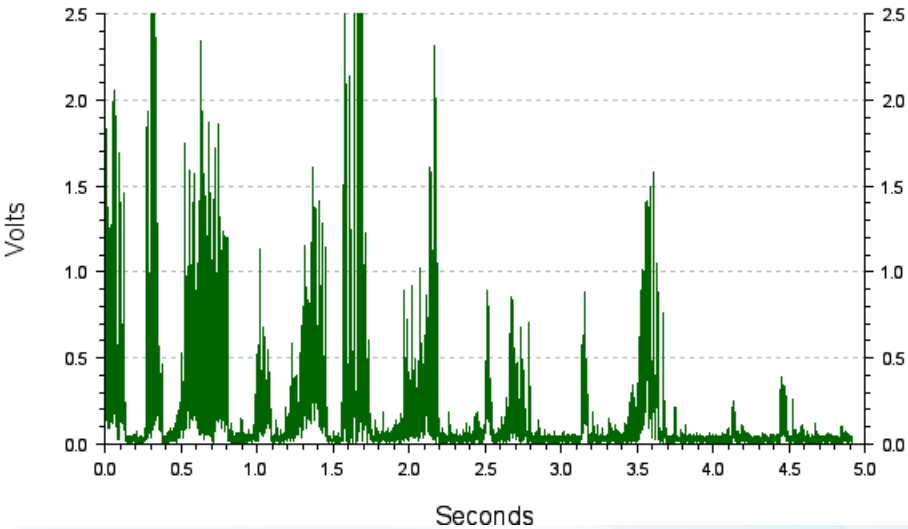


June 09

Nebraska Power - Ainsworth - T19 to T24

Turbines - T22 - MSB - 1

Date Recorded: 06/06/09 12:54:49

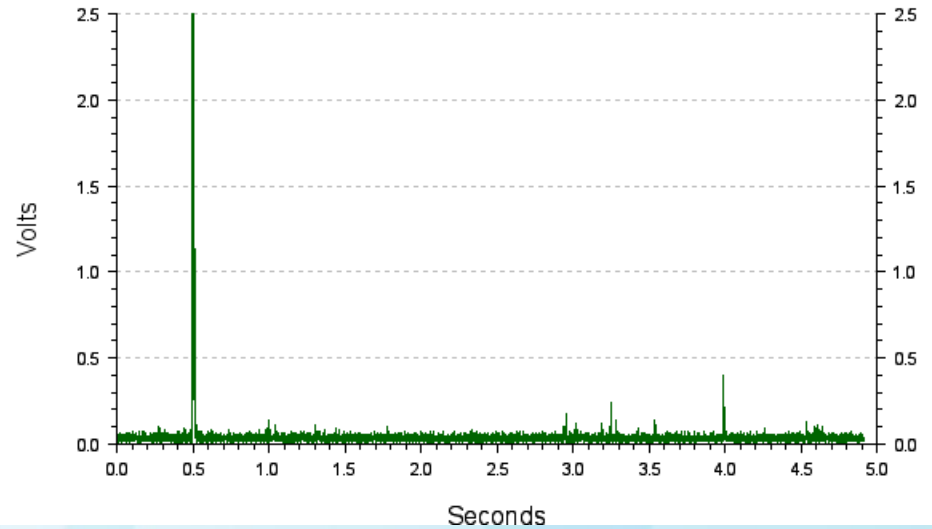


Aug 09

Nebraska Power - Ainsworth - T19 to T24

Turbines - T22 - MSB - 1

Date Recorded: 08/13/09 00:27:11



Histogram Data Comparison

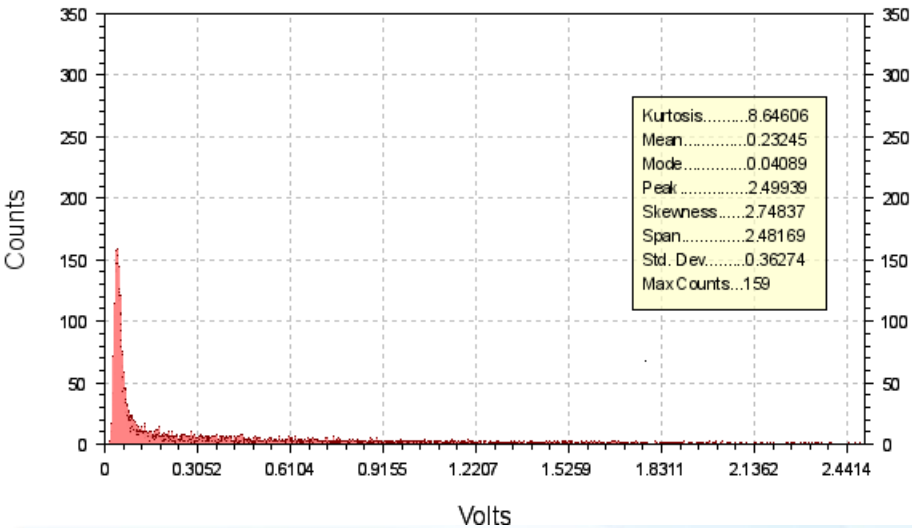


June 09

Nebraska Power - Ainsworth - T19 to T24

Turbines - T22 - MSB - 1

Date Recorded: 06/06/09 12:54:49

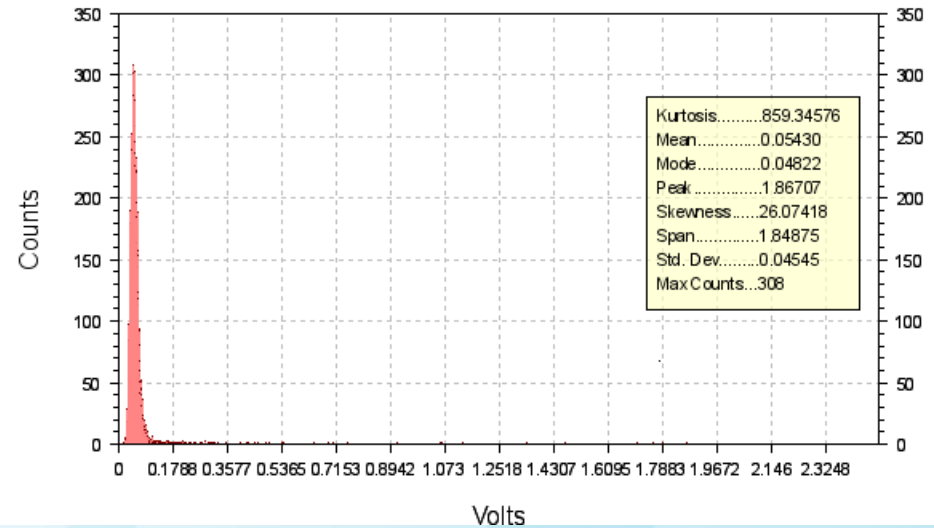


Aug 09

Nebraska Power - Ainsworth - T19 to T24

Turbines - T22 - MSB - 1

Date Recorded: 08/13/09 00:27:11



FFT Data Comparison

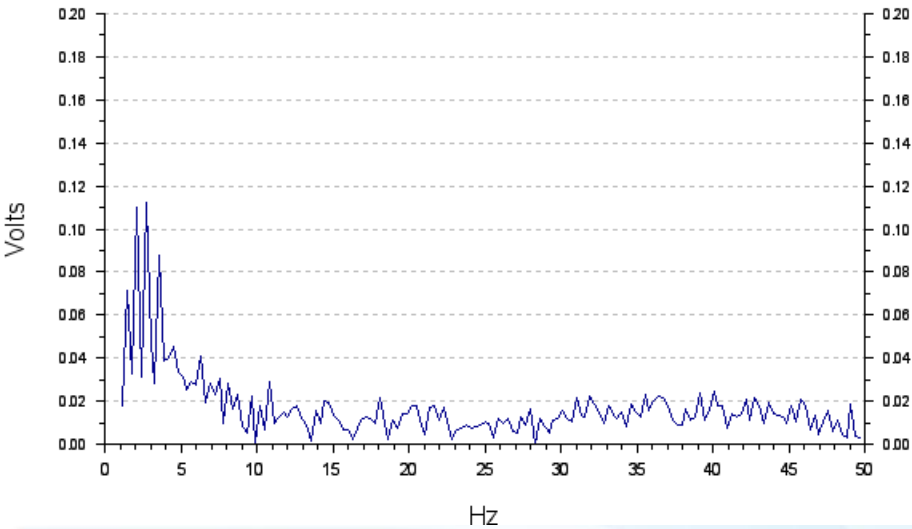


June 09

Nebraska Power - Ainsworth - T19 to T24

Turbines - T22 - MSB - 1

Date Recorded: 06/06/09 12:54:49

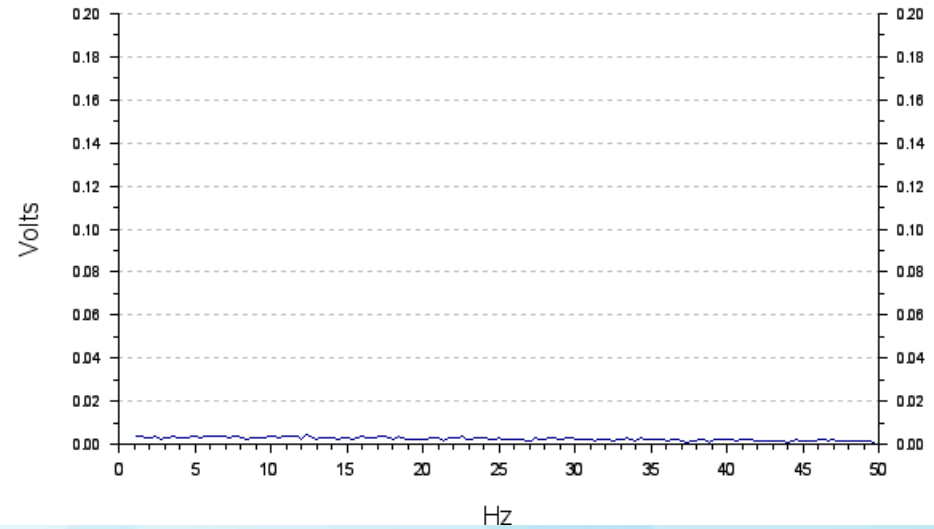


Aug 09

Nebraska Power - Ainsworth - T19 to T24

Turbines - T22 - MSB - 1

Date Recorded: 08/13/09 00:27:11





Sal Tareen
October 8, 2009

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